SYSTEMATICS AND DISTRIBUTION OF TWO RARE MEDITERRANEAN GOBIES, *CORCYROGOBIUS LIECHTENSTEINI* AND *ODONDEBUENIA BALEARICA* (TELEOSTEI: GOBIIDAE)

by

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ABSTRACT. - The distribution of the two gobiids *Corcyrogobius liechtensteini* (Kolombatovic, 1891) and *Odondebuenia balearica* (Pellegrin & Fage, 1907) in the Adriatic Sea is discussed. So far known from only 8 specimens, additional material of *C. liechtensteini* is described, including a first record outside the Adriatic Sea, from the Balearic Island of Ibiza. Neotypes are designated for *C. liechtensteini* and the generic diagnosis of *Corcyrogobius* is revised. New records of *O. balearica* show that this goby is widely distributed in the Adriatic, as far north as off Rovinj, on the Istrian coast of Croatia.

RÉSUMÉ. - La distribution de deux gobiidés, *Corcyrogobius liechtensteini* (Kolombatovic, 1891) et *Odondebuenia balearica* (Pellegrin & Fage, 1907) dans l'Adriatique est discutée. Du matériel est décrit comme appartenant à *C. liechtensteini* qui auparavant n'était connu qu'à partir de 8 spécimens, et une collection de 29 spécimens de l'île d'Ibiza (Baléares) représente le premier signalement de *C. liechtensteini* en dehors de l'Adriatique. Des néotypes sont désignés et la diagnose du genre *Corcyrogobius* est révisée. De nouvelles captures de *O. balearica* montrent que ce gobiidé est largement distribué dans l'Adriatique et même très au nord près des côtes de l'Istrie (Croatie) à Rovinj.

Key-words. - Gobiidae, *Corcyrogobius*, *Odondebuenia*, MED, Distribution, Head-canals, Coloration, Habitat.

Infrequent capture of small gobies is often taken as an indication of real numerical rarity in the ecosystem concerned. In some instances, more intensive collecting by conventional methods can reveal much greater abundance, as noted for *Lebetus* by Miller (1963). The introduction of SCUBA techniques has demonstrated the abundance and diversity of small gobies worldwide, including revelations for the European fauna (Miller, 1969; Van Tassell *et al.*, 1988). Nevertheless, the capture of other species may still remain erratic and inexplicable, as in *Pomatoschistus quagga* (Zander, 1982). Some gobies remain rare to science in the sense of being known only from a holotype, such as *Didogobius bentuvii* (Miller, 1966).

In other circumstances, small fish may be collected but overlooked once consigned to a museum. This has happened in the case of the two small gobiid species to be considered here, *Corcyrogobius liechtensteini* (Kolombatovic, 1891) and *Odondebuenia balearica* (Pellegrin & Fage, 1907). Originally, these gobies were regarded by

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Kolombatovic (1891) as juveniles and adults respectively of the same new species, *Gobius liechtensteini*. Systematic status was discussed for *C. liechtensteini* by Miller (1972) and for *O. balearica* by Miller and Tortonese (1968), with more recent information and comments by Miller (1986) and Van Tassell *et al.* (1988). The present paper gives new distribution records for the two species, and also amends the diagnosis of *Corcyrogobius*.

Abbreviations. NMW = Naturhistorisches Museum, Vienna. A, anal fin; C, caudal fin; D1, D2, first and second dorsal fins; P, pectoral fin; V, pelvic fin. Terminology of head canal pores as Miller (1986). Where possible in the material, body length and caudal fin length are given separately, linked by +; d = damaged.

CORCYROGOBIUS LIECHTENSTEINI (KOLOMBATOVIC, 1891)

(Fig. 1)

Gobius liechtensteini Kolombatovic, 1891: 25 (part).

Corcyrogobius liechtensteini (Kolombatovic): Miller, 1972: 396, figs 1-6; 1973: 493; 1986: 1030.

Gobius (Corcyrogobius) liechtensteini (Kolomabtovic): Soljan, 1975: 295, 470, 568.

Material

Croatia, Corcula (Curzola), 42°56'N, 16°55'E; 2 males, 17.5 + d and 20.0 + 5.0 mm, and 6 females, 14.5 + 3.8 - 17.5 + 4.5 mm (NMW 37536 - 37543); coll. Kolombatovic, Aug. 1901; don. Steindachner, 1902.

Croatia, Split (Spalato), 43°32'N, 16°30'E; 9 males, 19.6 + 4.7 - 24.5 + 6.1 mm, and 11 females, 17.1 + 3.4 - 20.2 + 4.4 mm (NMW 78460; syntypes (part), now designated as neotypes), coll. Kolombatovic, acq. Aug. 1892.

Spain, Balearic Islands, north coast of Ibiza, near Portinatx, 39°02' N, 01°05'E; 7 males, 14.5 + d - 24.0 + 5.5 mm, 14 females, 11.5 + 4.0 - 22.5 + 4.5 mm, and 8 juv., 7.5 + d - 10.5 + 3.5 mm; coll. R. Patzner, Aug. 1991.

Identification of types

Miller (1972) regarded as syntypes part of a collection (NMW 37536-547) which he believed Steindachner had obtained from Kolombatovic in 1902. This conclusion was supported by the mixture of individuals which corresponded with Kolombatovic's (1891) idea of juveniles and adults, although the latter were actually *Odondebuenia balearica*. Further nomenclatural comments on this situation are given by Miller (1972). However, the acquisition and catalogue sheets of Steindachner, overlooked for many years, prove that these specimens from Korcula were actually collected in August 1891. No syntypic status can therefore be assigned to them. During examination of gobiid fishes in the ichthyological collection at the Naturhistorisches Museum, Vienna, three other collections from Kolombatovic were located, all labelled *Gobius liechtensteini*. The specimens in two of these (NMW 78879, 78880) can all be identified as *Odondebuenia balearica*. Even though they have been referred to as types by Steindachner, this status cannot be accepted for them. Bought from Kolombatovic in 1895, they may represent "adults" of *Gobius liechtensteini*, but, in the original description of this species, Kolombatovic (1891) did not give any indications which allow the conclusion that this material is part of the syntype

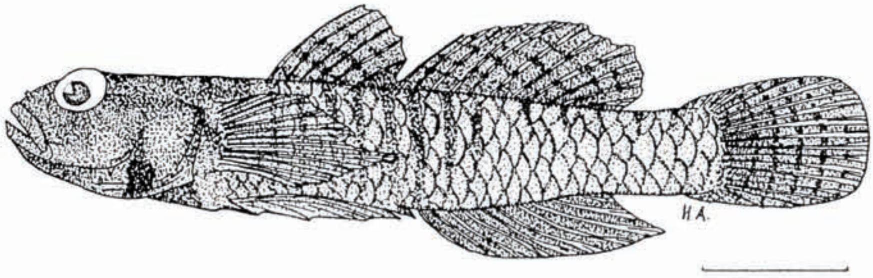

Fig. 1. - *Corcyrogobius liechtensteini*. Male, 24.0 + 5.5 mm, Ibiza. Scale bar = 5 mm.

series. Nevertheless, there are 24 specimens (NMW 78460, NMW 78461) from Kolombatovic, evidently taken in 1892, which (i) correspond closely with the original description, (ii) include "juveniles" as well as "adults", and (iii) arrived at the museum in the year after publication of the original description of *G. liechtensteini*.

Except for the above collections, no other material of *C. liechtensteini* has been located at the NMW. Only the specimens with the register numbers NMW 78460 and 78461 agree well with the composition of the material mentioned by Kolombatovic, which he noted was to be sent to Steindachner. Although there is no absolute proof, all indications suggest that these specimens are at least part of the syntype series. The 20 specimens of *Corcyrogobius liechtensteini* with the register number NMW 78460 are therefore now designated as neotypes. This excludes the material of collection NMW 78461 since four of these specimens are *O. balearica*.

Generic diagnosis

The original diagnosis of *Corcyrogobius* (Miller, 1972) included the head lateral-line canal feature of only one interorbital pore (termed λ/κ, in contrast to the two pores (λ and κ) normally present in many gobiid genera (Miller, 1986). However, inspection of the additional material of *C. liechtensteini* now shows that the typical head canal system of this species has two interorbital pores (λ and κ), seen in 54 specimens (Fig. 2), rather than the single pore λ/κ, which was found in the specimen illustrated by Miller (1972, fig. 6). Another specimen has been found to have an open groove between the positions of pores λ and κ. In addition, anterior oculoscapular pore β has been found to be present in 49 specimens, but present on only one side or absent in a further six examples (absent from both sides: 1; absent on left: 4; absent on right: 1). Miller (1972) selected the specimen then illustrated because of the good state of preservation of the sensory papillae, and it is ironic that this fish had to be the one with the most atypical head canal system. It is unlikely that more than one species is represented in the material available: all specimens studied by Miller (1972) and in the present paper would appear to be conspecific because of their distinctive branchiostegal spot and correspondence in meristics.

Definition of *Corcyrogobius* does not depend entirely on head canal features, and a second species, *C. lubbocki*, from West Africa, has been satisfactorily assigned to this genus although possessing two interorbital pores (Miller, 1988). Both species lack preopercular and posterior oculoscapular canals, and there is no pore β in the West African material.

Distribution (Fig. 3)

Until recently, *C. liechtensteini* has been known only from old collections in the NMW, all of which are from the middle Adriatic coast of Croatia, at Split (Fig. 3A: 1) and Korcula (Fig. 3A: 2). However, investigations with SCUBA techniques by one of us (RAP) on the northern coast of the Balearic island of Ibiza (Fig. 3A: 3), in the western Mediterranean, has revealed there a population of *C. liechtensteini*. This documents for the first time the occurrence of this species outside the Adriatic Sea.

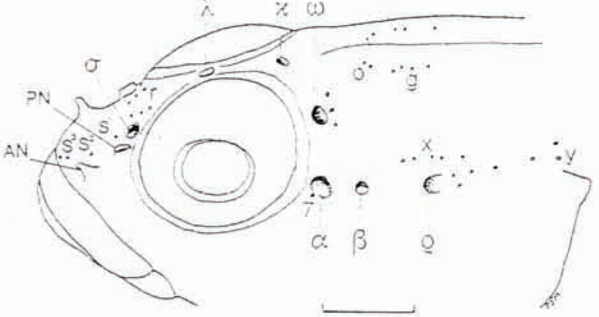

Fig. 2. - Head lateral-line canal pores and adjoining sensory papillae in *Corcyrogobius liechtensteini*, female, 22 + 4.5 mm, Ibiza. Nomenclature of pores (greek letters) and papillae as Miller (1986); AN, PN, anterior and posterior nostrils. Scale bar = 1 mm.

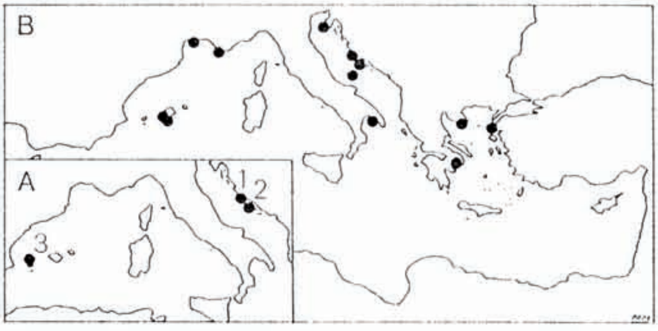

Fig. 3. - Distribution of (A) *Corcyrogobius liechtensteini*, and (B) *Odondebuenia balearica*, in the Mediterranean basins. Localities for *C. liechtensteini*: 1, Split; 2, Korcula; 3, Ibiza.

Biology

The biology of *C. liechtensteini*, one of the smallest European marine fish, has been hitherto unknown. Miller (1972, 1986) suggested that it is an inhabitant of coralline grounds, but actual observation off Ibiza shows that this tiny cryptobenthic goby occurs in small rock cavities, from 10 to 50 cm across, at depths of 5-25 m, a similar habitat to that of *C. lubbocki* from West Africa (Miller, 1988). Some of these rock cavities were only a few centimeters deep. Inside, the gobies were found in small holes.

Coloration (Fig. 1)

Preserved males. - Body brown with distinct reticulate pattern along scale edges. 7-9 lateral dark brown stripes, first below D1 I, fifth below contact D1-D2, eighth to ninth below D2 4 - D2 5. Stripes meet dorsally, but not ventrally. Interspaces broader than stripes. Head darker than body. Predorsal area to eyes with two to three stripes or mottled. Branchiostegal membrane on each side with intense, nearly black, dark blotch below vertical of preopercle. Ventral side of head and breast paler, lips dark. Unpaired fins dark, D1 with three, D2 with five and C with five irregular stripes. P and V hyaline. Urogenital papilla dark, almost black.

Preserved females. - Same coloration as males, but somewhat paler. No sexual dimorphism in pigmentation evident. Urogenital papilla with lateral dark stripes.

Living female (one, 11.5 mm SL, from a colour-slide). - Body and head orange; head and anterior part of the body darker than posterior part; laterally, nine more or less distinct bluish vertical stripes, which become dark brown on preservation. The dark branchiostegal blotch is not as distinct in life as in the same specimen preserved. Unpaired fins with irregular orange-red stripes, most obvious on D1 and D2.

Life coloration of males not known, but may be more vivid than that of females.

ODONDEBUENIA BALEARICA (PELLEGRIN & FAGE, 1907)

Gobius liechtensteini Kolombatovic, 1891: 25 (part)

Eleotris balearicus Pellegrin & Fage, 1907: 11; Fage, 1907: 11, 72, 83.

Odondebuenia balearica (Pellegrin & Fage): De Buen, 1930: 1; Miller & Tortonese, 1968: 342; Miller,1973: 505; 1986: 1066.

Material

Croatia, Korcula (Curzola); 42°56'N, 16°55'E; 3 males: 17.0 + 5.0 - 25.0 + 7.1 mm, and 1 female: 18.5 + 5.0 mm (NMW 37544-37547), coll. Kolombatovic, August 1901; don. Steindachner, 1902.

Croatia, Split (Spalato); 43°32'N, 16°30'E; 1 male: 23.7 + 5.9 mm, and 1 female: 20.0 + 5.4 mm (NMW 78879); coll. Kolombatovic, August 1894; don. Steindachner, 1895 (Aug.); 3 males: 18.8 + 4.7 - 28.6 + 6.4 mm, and 4 females: 18.2 + 5.1 - 28.3 + 6.1 mm (NMW 78880); coll. Kolombatovic, don. Steindachner 1895 (March); 4 males: 16.4 + 4.7 - 25.0 + 7.5 mm (NMW 78461), syntypes of *G. liechtensteini* (part)); coll. Kolombatovic, don. Steindachner August 1892.

Croatia, Rovinj (Rovigno), Due Sorelle [Dvije Sestrice] islands, 45°05'N, 13°40'E; 1 female: 12.7 + 2.8 mm (NMW 87146); stony ground, depth 15 m, coll. O. Pesta, 10 May 1912.

Croatia, Hvar (Lesina), 43°11'N, 16°28'E; 3 males: 19.8 + 4.6 - 22.2 - 4.7 mm, and 2 females: 18.2 + 3.1 - 19.4 + 4.5 mm (NMW 87835), coll. Bucchich; no collecting date or acquisition number available.

Yugoslavia, near Palagruza (Pelagosa) island, 42°23'N, 16°21'E; 1 male: 25.1 + d, and 2 specimens in bad condition, sex not determinable: 21.4 + 5.4 and 22.6 + d (NMW 87965), "Najade" (N XI, B), Nov./Dec. 1913.

Without data. - 4 males: 22.2 + 4.9 - 28.2 + 7.5 mm, and 4 females: 15.4 + 5.3 - 21.4 + 5.1 mm (Zoological Institute, University of Salzburg).

Generic status

This small goby, originally regarded as an eleotridid by Pellegrin and Fage (1907), is the type species of *Odondebuenia* De Buen, 1930. In the same genus, De Buen (1930) included the even rarer Balearic species *Eleotris pruvoti* Fage, 1907. However, in contrast to *O. balearica*, the latter has an additional transverse row of papillae below the eye, a disparity noted by Miller and Tortonese (1968). Largely on this basis, Van Tassell *et al.* (1988) concluded that *pruvoti* belongs to the genus *Vanneaugobius* Brownell, 1978 and consequently *Odondebuenia* becomes monotypic.

Nomenclature

From the admixture of this species and *C. liechtensteini* in material collected by Kolombatovic, and his original text, it seems likely that the specimens which Kolombatovic (1891) regarded as adults of his *Gobius liechtensteini* were actually *Eleotris balearicus* Pellegrin & Fage, 1907 (Miller and Tortonese, 1968; Miller, 1972). Since Kolombatovic (1891) did not designate a holotype or subsequent lectotoype from among the material on which he based *Gobius liechtensteini*, this name has no claim as a senior synonym to replace *balearicus* Pellegrin & Fage, 1907 (Miller, 1972).

Distribution (Fig. 3)

Odondebuenia is known only from the Mediterranean basins, since a record of Dollfus (1955) from the Atlantic coast of Morocco has been shown to be a species of *Vanneaugobius* (Brownell, 1978; Van Tassell *et al.*, 1987). The distribution up to 1967 was reviewed by Miller and Tortonese (1968). Further records may now be listed, from more recent field work or from re-identification of material in museum collections.

These are:

Gulf of Lyon: off the Isle des Embiez, 11 July 1980 (Escoubet *et al.*, 1981); also a specimen off Montpellier by C. Bourquard.

Tyrrhenian Sea: while examining European gobiids in the collection of the USNM, our colleague Mr. J. Van Tassell found two specimens from Naples, obtained by S. Meek in 1895. These are in excellent condition, and could have formed the basis for a new taxon a decade before the discovery by Fage. However they were catalogued as *Gobius niger*!

Gulf of Taranto: common, from *Cladophora* beds (Parenzan, 1973).

Adriatic Sea: Split; Dvije Sestrice islands off Rovinj islands; Palagruza; and Hvar (see Material).

Aegean Sea: Khalkidiki Peninsula, with sponges (Koukouras *et al.*, 1985).

Biology

The biology of *O. balearica* was summarised by Miller (1986). Earlier regarded as associated with offshore coralline algae, this species has also been reported as a typical inhabitant of extensive *Cladophora* beds in the Gulf of Taranto, at depths of 28-34 m (Parenzan, 1973). Material in the Zoological Institute, University of Salzburg, of unknown provenance, includes a male of 36 mm total length, larger than the maximum of 32 mm recorded by Miller and Tortonese (1968).

CONCLUSION

The aforementioned records expand the known distribution of two small Mediterranean gobies. Miller and Tortonese (1968) and Miller (1972) suggested that these species were probably of widespread occurrence throughout the Mediterranean basins. Present findings (Fig. 3) support these hypotheses, although the southern and south-eastern Mediterranean require further exploration. The accumulation of such data provides further essential raw material without which detailed discussion of Mediterranean marine zoogeography is impossible. It is an exercise of increasing relevance to modern concern with the monitoring and preservation of biodiversity.

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